

# PATENT SPECIFICATION



Application Date: Oct. 14, 1920. No. 29,065 / 20.

174,152

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## PROVISIONAL SPECIFICATION.

Improvements in or connected with Mechanism for Imparting to a Support, Carrier or the like, Movements of a Determined Character, in or connected with Apparatus comprising Material Distributing Appliances, Cutting Devices, or the like.

I, HUGH WATSON MACKENZIE, a British subject, of 119, Spencer Place, Leeds, do hereby declare the nature of this invention to be as follows:—

5 This invention relates to the production of apparatus in which a support carrier or the like is provided mounted to move freely in a plane parallel to its surface in such a manner that any line on 10 its surface is maintained parallel to its original position, and the principal object of this invention is to provide new or improved mechanism for imparting to the support, carrier or the like movements of 15 an arbitrary character, or movements in accordance with diagrams, or determined by guides, or by the operation of directing mechanism.

According to this invention the support, carrier or the like (which for convenience of description will in the first place be assumed to be a table having a flat surface arranged horizontally) may be mounted to slide on guides or swing about 25 axes which are at right angles to one another and in this case are horizontal, being parallel to the surface of the table, and the movements required to be imparted to the table are transmitted 30 through the medium of a rocking arm which is mounted at a position between its ends to turn about or approximately about a centre freely in all angular directions, the movements to be imparted 35 being applied to one end, say, the outer end, in which case the movements transmitted are from the inner end of the arm. In practice, the distance between the inner end of the arm, which is con-

nected, by a direct or indirect coupling, 40 to transmit its movements to the table, and the centre may usually be short in comparison with the distance between the centre and the outer end of the arm, and provision may be made for altering the 45 position of the centre relative to the ends of the arm.

Arbitrary movements may, for example, be applied to the outer end of the arm by hand actuation in accordance with the decision of an operator. In other cases the outer end of the arm may be guided by hand in accordance with a diagram. The movements of the outer end of the arm may be directed by 50 engagement with a guiding diagram. A system of gearing may be provided for directing the outer end of the arm, for example; a plate may be provided arranged to rotate about an axis co-axial 55 with the normal axis of the arm, assumed to be vertical, and upon this plate, epicyclic, circular, elliptical, double lobe, or other form of auxiliary gear may be provided intergeared with the plate, and 60 arranged for example so that the outer end of the arm, which is connected to be driven by the auxiliary gear, partakes of the rotational motion of the plate combined with the motion imparted by the 65 auxiliary gear. In another case a guide may be provided for directing the movement of the outer end of the arm, and provision made for mechanically moving the end of the arm along the guide. For 70 example, a rack may be provided along the path of the guide and a pinion be fixed at the outer end of the arm, and

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provision made for rotating the arm, so that with the pinion in mesh with the rack, the arm is moved along the guide. 45

In one form of construction the rocking arm may be of shaft formation arranged to extend diametrically through a ball which is mounted in a spherical bearing so carried in guides as to be capable of axial adjustment for varying the position of rock. Thus, assuming that the normal position of the arm is vertical the guide is also vertical and provision may be made for readily adjusting the position of the spherical bearing. As 50

an example of an alternative method of support, a gimbal mounting may be provided. For guiding the outer end of the arm a guide plate (or directing mechanism) of the required character may be 55

fixed with its centre co-axial with the normal axis of the arm and with its surface generally at right angles to the axis. The surface of the guide plate may be concave or flat and provision may be 60

made if required to permit endwise movement of the outer end of the rod relative to the centre of rock, for example, it may be telescopic and be extended by a spring or otherwise. 65

20 Apparatus according to this invention is particularly adapted for use in conjunction with material distributing appliances, cutting devices and the like. For example, a number of stationary distributing nozzles may be arranged above 70

the surface of the table for discharging material, for example, by controlled extrusion, upon the surface of the table at separate positions, while the table is 75

40 moved. For example, the material dis-

tributed may be for making cakes, biscuits, confections, chocolates and the like, or for applying to formed articles placed upon the table a coating or partial coating of a decorative character which in each case will be similar and in accordance with the movements imparted to the table. Cutters, for example, may be provided in place of nozzles and provision made for rotating the cutters rapidly or at such a speed so that the cutting edge of each cutter is maintained opposed to the direction of movement of the table. Cutters of this character may be used for dividing wafers, for engraving and other purposes. 80

As an example of another application of this invention a carrier may be provided furnished, for instance, with distributors or cutters, the movements in this case being imparted to the carrier. Associated with a carrier of this description the articles to be produced or operated on may be formed or supported on a bed while stationary and in some cases provision may be made for intermittently moving the bed when the operations are completed, or for intermittently advancing beds successively into position on which groups of articles are to be formed or on which groups of articles to be operated on are mounted, or on which material to be operated on is placed. 85

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Dated this 13th day of October, 1920. 75

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#### COMPLETE SPECIFICATION.

#### Improvements in or connected with Mechanism for Imparting to a Support, Carrier or the like, Movements of a Determined Character, in or connected with Apparatus comprising Material Distributing Appliances, Cutting Devices, or the like.

80 I, HUGH WATSON MACKENZIE, a British subject, of 119, Spencer Place, Leeds, do hereby declare the nature of this invention and in what manner the same is to be performed, to be particularly described and ascertained in and by the following statement:—

This invention relates to the production of apparatus in which a support, carrier or the like, hereinafter referred to generally as the movable member, is

provided mounted to move freely in or approximately in a plane in such a manner that when the member is moved any straight line on the movable member parallel to the plane is maintained parallel to its original position, or approximately so, which movement will hereinafter be referred to generally as parallel universal movement, and the principal object of this invention is to provide new or improved mechanism for

mechanically imparting to the movable member movements determined by guides, or by the operation of directing mechanism.

5 The movable member (which in the first place will be assumed to be a table having a flat surface arranged horizontally) may be mounted in any suitable known manner, for example, it may be mounted 10 to slide on guides which are at right angles to one another and in this case are horizontal, being parallel to the surface of the table, and the determined movements required to be imparted to the 15 table are transmitted through the medium of a rocking arm which is mounted at a position between its ends to turn about or approximately about a centre (normally fixed) freely in all angular directions, 20 the movements to be imparted being applied to one end, say, the outer end, in which case the movements transmitted are from the inner end of the arm. In practice, the distance between the inner 25 end of the arm, which is connected by a direct or indirect coupling, to transmit its movements to the table, and the centre may usually be short in comparison with the distance between the centre and the 30 outer end of the arm, and provision may be made for altering the position of the centre relative to the ends of the arm.

According to this invention the determined movements are applied mechanically to the outer end of the rocking arm. For example, the movements applied mechanically may be directed by arranging the outer end of the arm to engage with an endless guide associated 35 with mechanical means for sweeping the arm around the guide. A system of gearing may be provided for directing the outer end of the arm, for example, a plate may be provided arranged to rotate 40 about an axis co-axial with the normal axis of the arm, assumed to be vertical, and upon this plate, epicyclic, circular, elliptical double lobe or other form of auxiliary gear may be provided inter- 45 geared with the plate and arranged for example, so that the outer end of the arm, which is connected to be driven by the auxiliary gear, partakes of the rotational motion of the plate combined with 50 the motion imparted by the auxiliary gear. In another case a guide may be provided for directing the movement of the outer end of the arm, and provision made for mechanically moving the end 55 of the arm along the guide. For example, a rack may be provided along the path of the guide and a pinion be fixed at the outer end of the arm, and provision made 60 for rotating the arm, so that with the pinion in mesh with the rack, the arm is moved along the guide.

In one form of construction the rocking arm may be of shaft formation arranged to extend diametrically through a ball which is mounted in a spherical bearing so carried in guides as to be capable of axial adjustment for varying the position of rock. Thus, assuming that the normal position of the arm is vertical the guide is also vertical and provision may be made for readily adjusting the position of the spherical bearing. As an example of an alternative method of support, a gimbal mounting may be provided. For guiding the outer end of the arm a guide plate (or directing mechanism) of the required character may be fixed with its centre co-axial with the normal axis of the arm and with its surface generally at right angles to the axis. The surface of the guide plate may be concave or flat and provision may be made if required to permit endwise movement of the outer end of the rod relative to the centre of rock, for example, it may be telescopic and be extended by a spring or otherwise.

Apparatus according to this invention is particularly adapted for use in conjunction with material distributing appliances, cutting devices and the like. For example, a number of stationary distributing nozzles may be arranged above the surface of the table for discharging material, for example, by controlled extrusion, upon the surface of the table at separate positions, while the table is moved. For example, the material distributed may be for making cakes, biscuits, confections, chocolates and the like, or for applying to formed articles placed upon the table a coating or partial coating of a decorative character, which in each case will be similar and in accordance with the movements imparted to the table. Cutters, for example, may be provided in place of nozzles and provision made for rotating the cutters rapidly or at such a speed so that the cutting edge of each cutter is maintained opposed to the direction of movement of the table. Cutters of this character may be used for dividing wafers, for engraving and other purposes.

As an example of another application of this invention a carrier may be provided furnished, for instance, with distributors or cutters, the movements in this case being imparted to the carrier. Associated with a carrier of this description the articles to be produced or

operated on may be formed or supported on a bed while stationary and in some cases provision may be made for intermittently moving the bed when the operations are completed, or for intermittently advancing beds successively into position on which groups of articles are to be formed or on which groups of articles to be operated on are mounted, or on which material to be operated on is placed.

Some examples of construction and modification of details will now be described with reference to the accompanying drawings in which:—

15 Figures 1 and 2 are a side and a front elevation illustrating a construction of apparatus.

Figure 3 is a plan, Figure 4 is a broken plan and Figure 5 is a sectional elevation 20 of a system of gearing.

Figures 6 and 7 are diagrams to be described.

Figure 8 is an elevation illustrating a construction of apparatus, and

25 Figure 9 illustrates a modification.

Figure 10 is a broken plan and Figure 11 is a sectional elevation of a modification.

Figure 12 is an elevation and Figure 30 13 is a plan, and Figure 14 is a plan and Figure 15 is an elevation each respectively of mechanism to be described.

In the drawings A designates the movable member which is represented in each 35 case as consisting of a table, and B the rocking arm.

In Figures 1 and 2, the table A is supported so as to remain horizontal and is mounted to slide on a rod 1 which is fixed 40 to and at right angles to rods 2. The rods 2 slide in brackets. The table A is thus free to slide on the rod 1 and move laterally thereto when sliding with the rods 2, so that parallel universal movement may be imparted to it. The rocking arm B passes through a spherical bearing C which permits it to turn freely in all angular directions, and as indicated is arranged capable of vertical 45 adjustment by connection with a lever 3. The inner end (in this case the upper end) of the arm B engages with a socket 4 on the underside of the table and the outer end of the arm B is connected to a system 50 of gearing, which will be described with reference also to Figures 3, 4 and 5. This system comprises a power driven pinion 5 which meshes with a toothed gear wheel D, gear wheels 6, 7 and 8, carried by the wheel D, a stationary toothed gear 9 and two lobe gear wheels. 55 E, F which mesh with one another. The lobe E and gear wheel 8 are connected to

rotate together. In operation as the wheel D is rotated the lobe E is rotated 65 about its axis being driven by the gear 6 (in mesh with the stationary gear 9) and gear wheels 7 and 8, and the lobe wheel F is driven by the lobe E. In each lobe two sockets E<sup>1</sup> E<sup>2</sup> and F<sup>1</sup> F<sup>2</sup> are formed, 70 in any one of which the outer end of the rocking arm B may be placed and its movements thereby directed. Thus when in engagement with the socket E<sup>1</sup> movements are imparted to the table A such that all points describe a path as illustrated at Figure 6 and when in engagement with the socket F<sup>2</sup> paths as illustrated at Figure 7, in the latter case the outer path being described when bearing C is in a low position and the inner path when in a high position.

75 In Figures 1 and 2 G indicates a series of distributing nozzles of an extrusion apparatus. This apparatus is adapted to be operated in one position and traversed laterally for subsequent discharges.

80 In Figure 8 the movable member A is mounted to rest upon a horizontal bed H, and is guided by two rocking arms B being provided to which corresponding rocking movements are imparted. In this case two gear systems driven by connected power shafts are indicated but as indicated at Figure 9 one power drive 85 only may be used by connecting the wheels D. This method may also be applied for driving the lobe wheels E.

90 In Figures 10 and 11 a stationary diagram guide K is provided with which the rocking arm B engages, and is moved along the guide K by a power driven wheel K<sup>1</sup> formed with a radial slot 95 through which the arm B extends.

100 Figures 12 and 13 illustrate a gimbal support to permit the lever B to rock freely in all angular directions associated with means for rotating the arm B such, for example, as will be described with reference to Figures 14 and 15. 105 This support comprises axes at right angles to one another and is associated with a driving pinion L, mounted coaxial with one of these axes, which gears with a toothed wheel N with which the arm B is connected to rotate while being free to move endwise therein.

110 Figures 14 and 15 illustrate a construction comprising a guide P for the rocking arm B to engage with associated with gear such as described with reference to Figures 12 and 13 in which the arm B is rotated. In this case a pinion R is 115 fixed to the outer end of the arm B to engage with a rack T, whereby in operation the arm is moved along the guide.

Having now particularly described and ascertained the nature of my said invention and in what manner the same is to be performed, I declare that what I claim is:—

1. Apparatus comprising a support, carrier or the like (movable member) mounted capable of universal parallel movement, a rocking arm mounted at a position between its ends to turn about or approximately about a centre (normally fixed) freely in all angular directions, and mechanism for mechanically imparting movements to one end (the outer) of the rocking arm which are transmitted from the other end (the inner) of the arm to the movable member.
2. Apparatus according to Claim 1, characterised by the provision of a system of gearing for directing the movements of the outer end of the arm.
3. Apparatus according to Claim 2 characterised by the system of gearing provided comprising a rotatable part arranged to rotate about an axis co-axial, or approximately so, with the normal axis of the arm, associated with epicyclic, circular, elliptical, double lobe or other form of auxiliary gear, intergeared with the rotatable part the outer end of the arm being driven by the auxiliary gear which partakes of the rotational motion of the rotatable part.
4. Apparatus according to Claim 1, characterised by a guide being provided for directing the movements of the outer end of the arm associated with mechanism for moving the end of the arm along the guide.

5. Apparatus according to Claim 4, characterised by the mechanism for moving the outer end of the arm along the guide comprising a power driven wheel formed with a radial slot through which the arm extends.

6. Apparatus according to Claim 4 characterised by a rack being provided along the path of the guide, and at the outer end of the rod a pinion being provided to gear with the rack and by rotation move the arm along the guide.

7. Apparatus according to any of the preceding claims associated with material distributing appliances, cutting devices or the like.

8. Apparatus substantially as described with reference to Figures 1 and 2 of the accompanying drawings.

9. Mechanism substantially as described with reference to Figures 3, 4 and 5, to Figures 10 and 11, or to Figures 12, 13, 14 and 15, of the accompanying drawings.

10. Apparatus substantially as described with reference to Figure 8 or 65 modified as described with reference to Figure 9 of the accompanying drawings.

11. Mechanism for imparting to a support, carrier or the like, movements of a determined character, and in or connected with apparatus comprising material distributing appliances, cutting devices, or the like, substantially as described.

Dated this 13th day of August, 1921.

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Agent for the Applicant.

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FIG: 1.

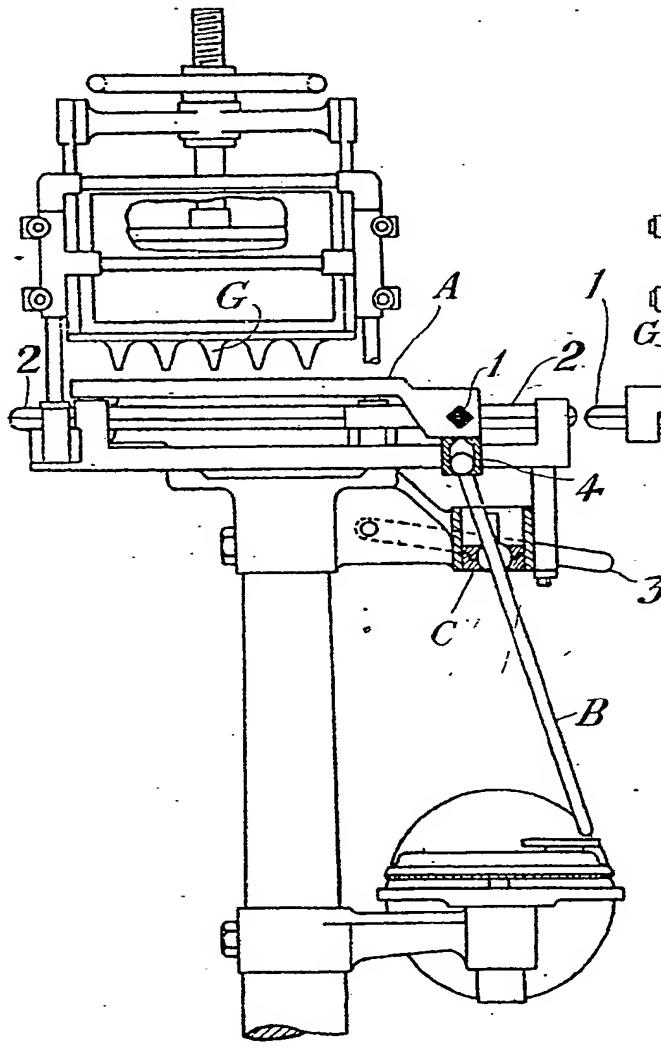


FIG: 2.

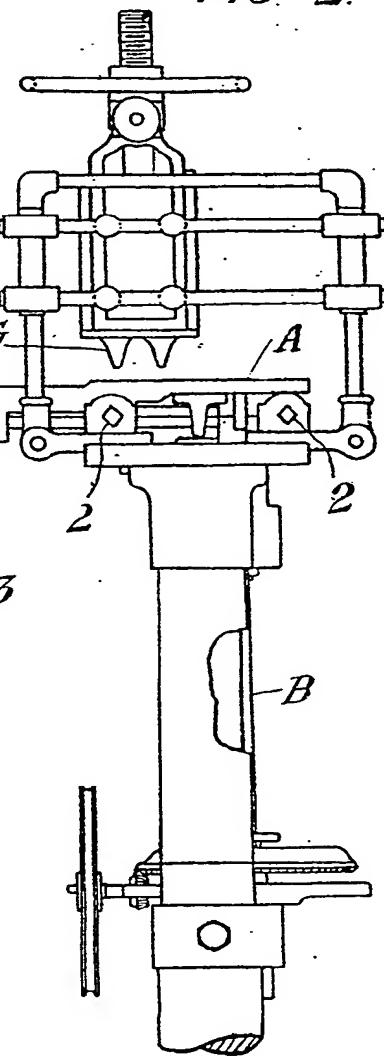


FIG: 6.

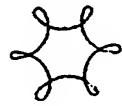
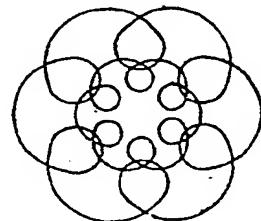


FIG: 7.



FIG

SHEET 1

FIG:3.

2.



11

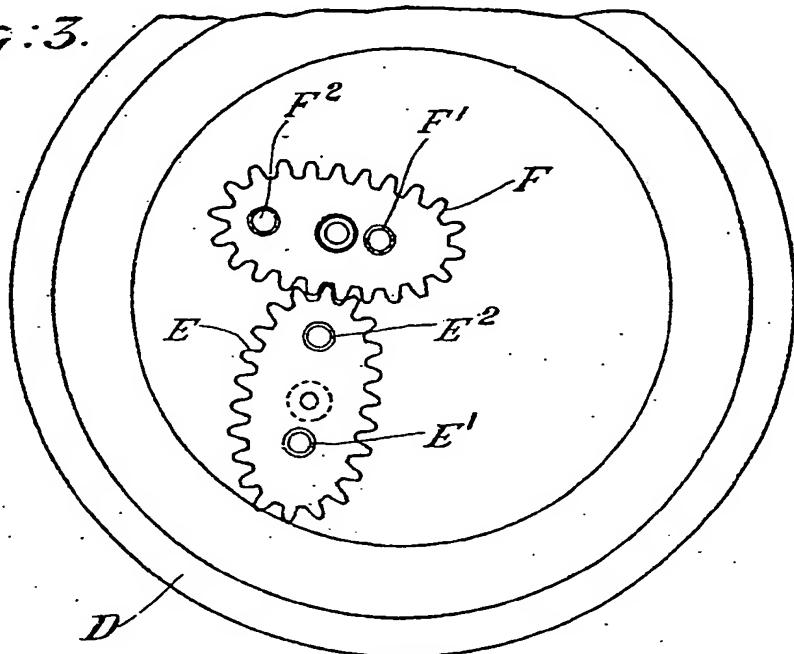


FIG:4.

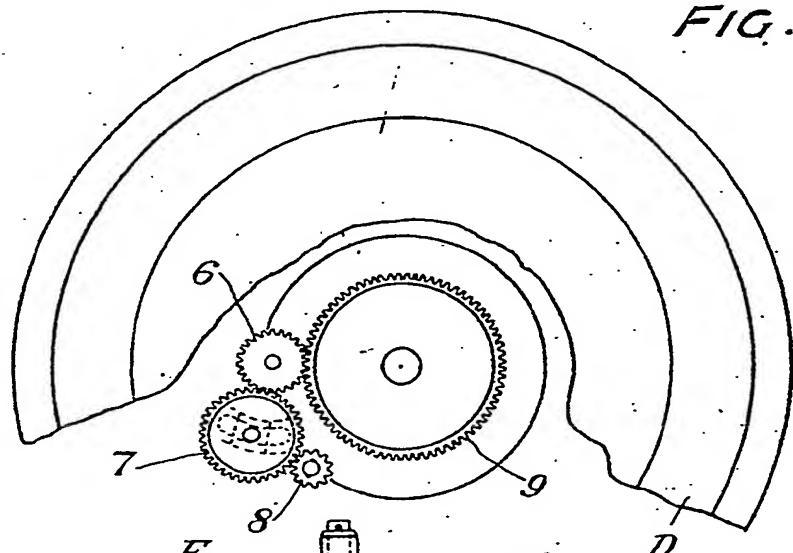
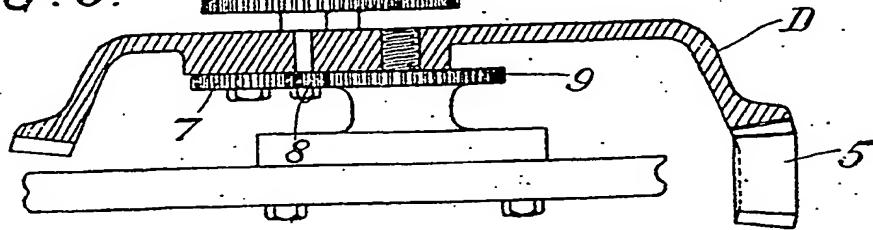


FIG:5.



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FIG: 1.

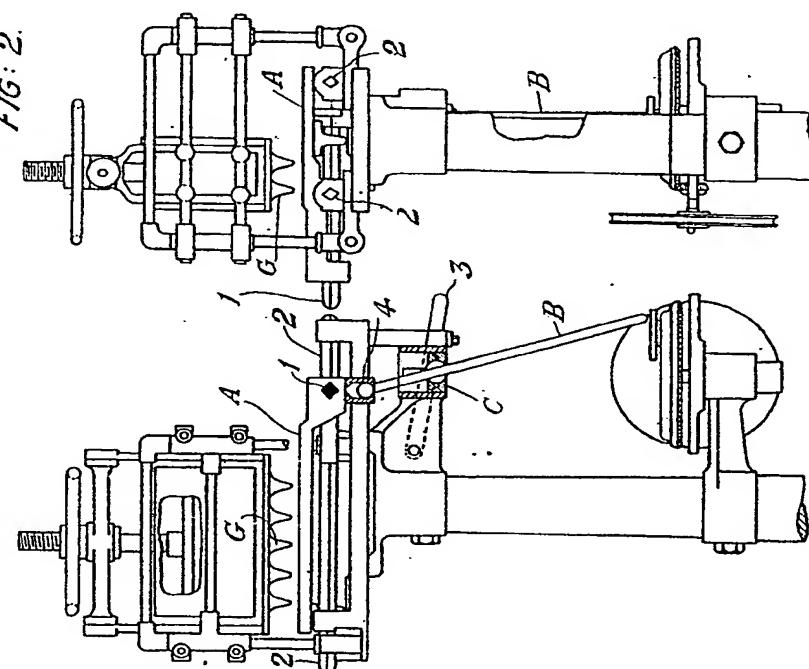


FIG: 6.



FIG: 7.

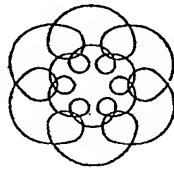


FIG: 2.

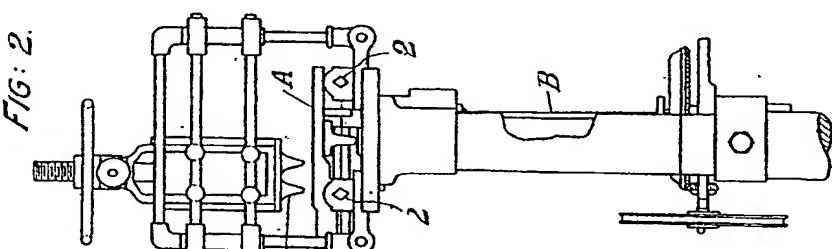


FIG: 3.

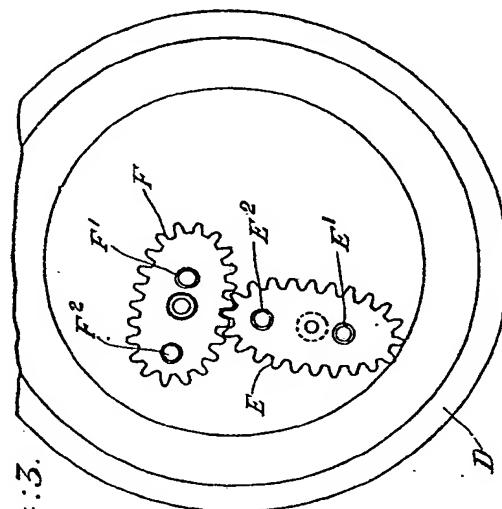


FIG: 4.

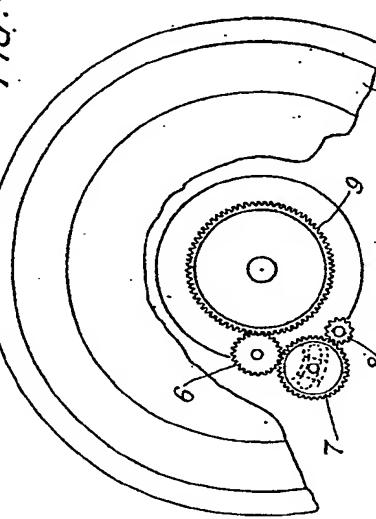


FIG: 5.

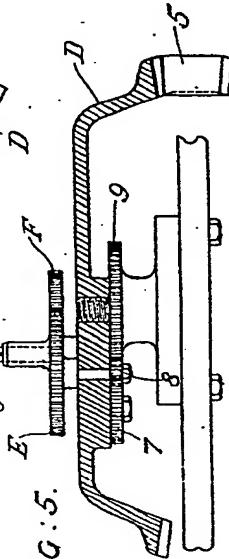


FIG: 10.

FIG: 8.

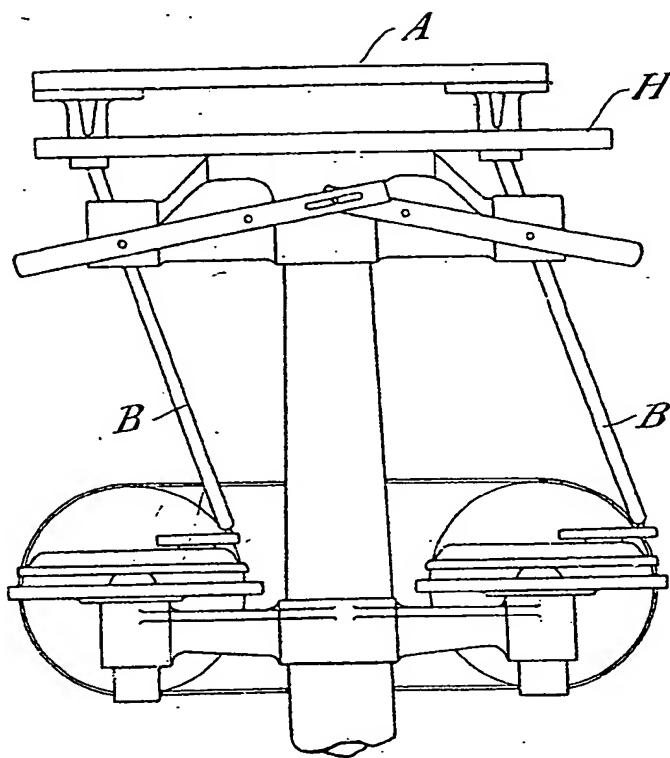


FIG:

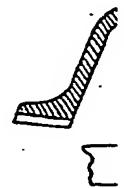
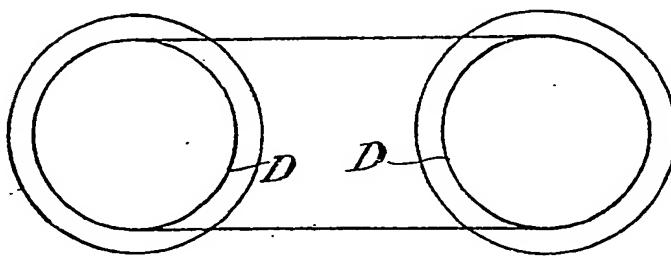


FIG: 9.



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FIG: 10.

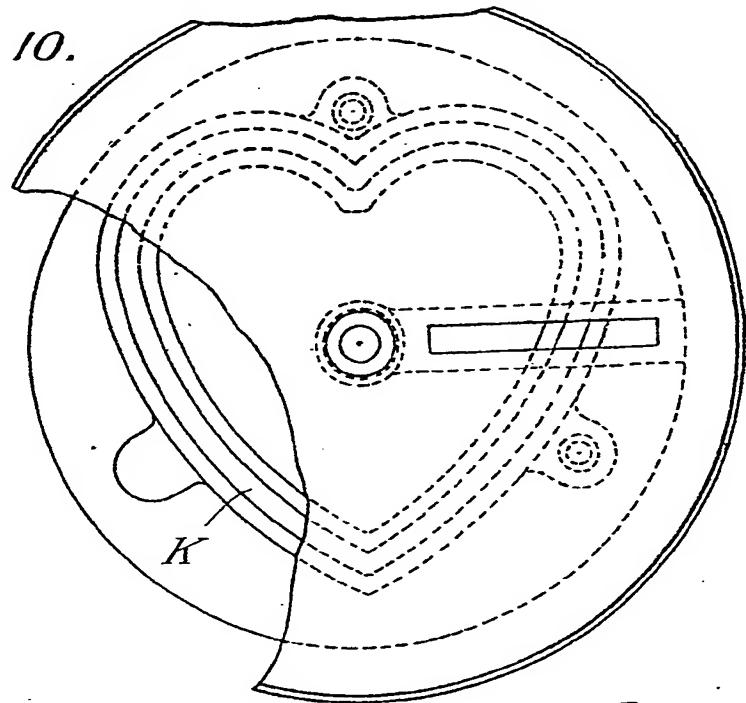


FIG: 11.

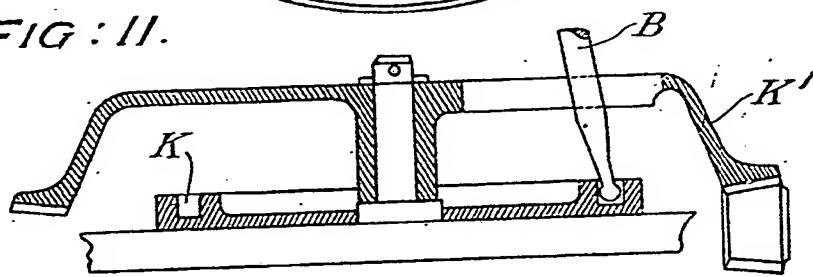


FIG: 12.

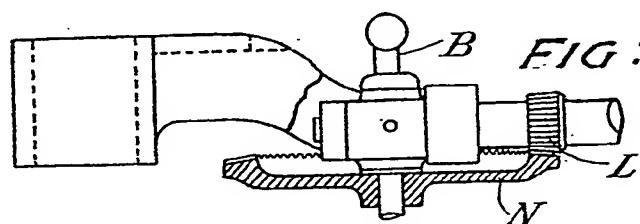


FIG: 13.

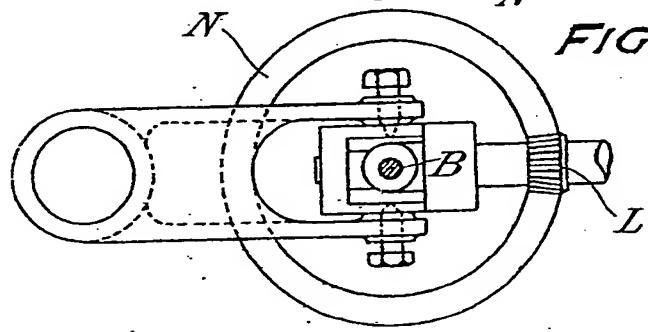


FIG: 8.

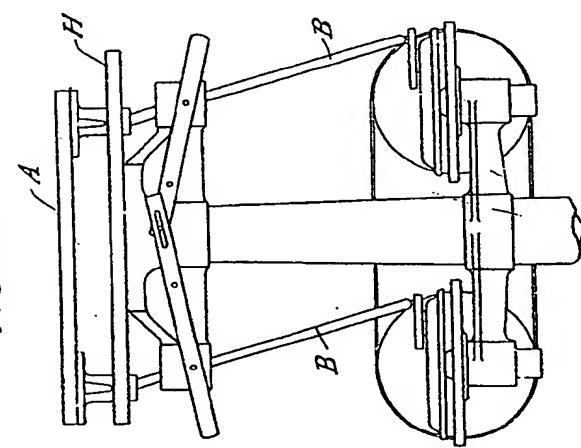


FIG: 9.

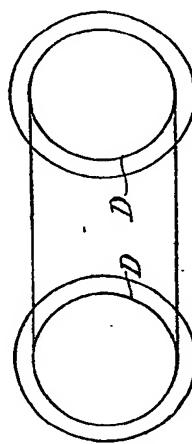


FIG: 10.

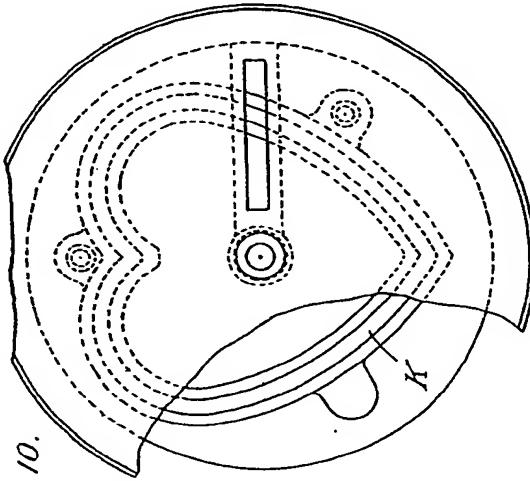


FIG: 11.

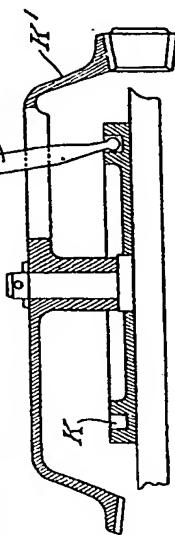


FIG: 12.

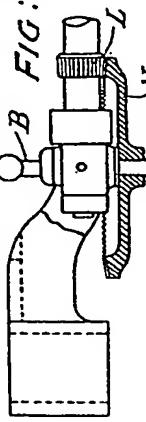
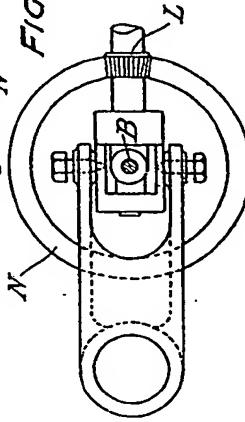
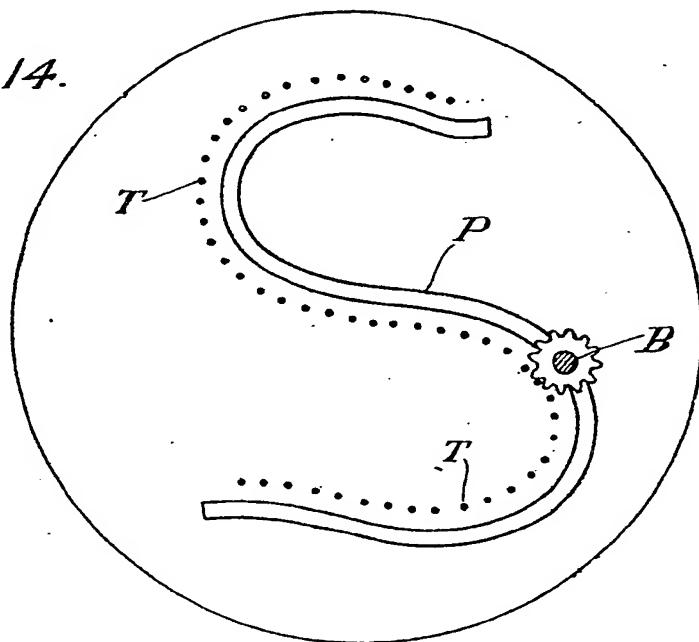


FIG: 13.



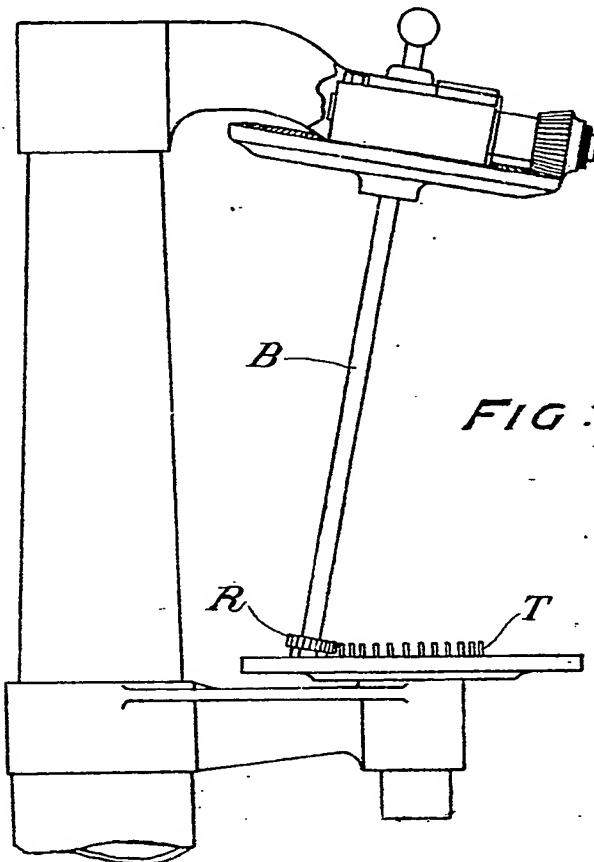
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FIG: 14.



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FIG: 15.



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